

Chapter A

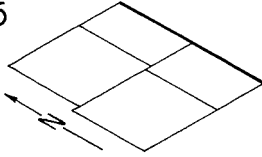
General Proportionment Problems

A2

GENERAL PROPORTIONMENT PROBLEMS

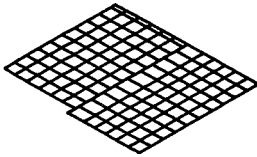
History of Surveys

1875



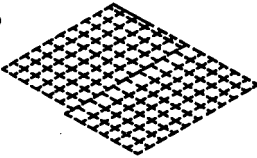
1875 Chandler Robbins surveyed the Arizona New Mexico state line, which is the east boundary of fractional range 31 east, Gila and Salt River Meridian, Arizona.

1882



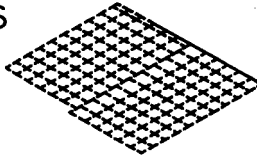
1882 Milton Santee retraced the state line, surveyed and resurveyed the third standard" parallel north, surveyed the boundaries and subdivisional lines of townships 12 and 13 north, ranges 30 and 31 east, Gila and Salt River Meridian, Arizona.

1936



1936 Lloyd Toland resurveyed the Arizona - New Mexico state line from mile post 166 to 171.53 and established half mile posts, as part of a dependent resurvey in New Mexico.

1946



1946 Oscar Walsh and Clarence Bilbray resurveyed the state boundary from mile post 171.53 to mile post 183 as part of a dependent resurvey in New Mexico.

Reason for Request of this Survey

The survey was routinely requested for use in land administration.

Special Instructions

On February 16, 1966, Special Instructions were issued for Groups 443 and 444, Arizona, providing for the dependent resurvey of the boundaries and subdivisional lines in the four townships of sections which contained public lands. The Special Instructions specifically provide for the establishment of 1/4 section corners of minimum control, not previously established, and for the establishment of 1/16th 80 and 1/16th 100 corners for the elongated sections in T. 12 N., Rs. 30 & 31 E. The four townships contain intermingled private and public lands but the ownership status is not pertinent to any specific point in the case.

Upon assignment of Groups 443 and 444, Arizona, specific attention was called to the Executive Order of April 17, 1926, which provides for the withdrawal of vacant and unreserved public lands which contain or are within one quarter mile of a spring or water hole. The surveyor was directed to make a direct tie to all such springs or water holes within a reasonable distance of the lines being resurveyed, to facilitate the determination of whether any lands were to be withdrawn under this Executive Order. Figure 5 is a copy of the Executive Order. The essential information required is outlined in Section 3-126, subparagraphs 11 and 20 of the Manual of Surveying Instructions, 1973.

ORDER OF WITHDRAWAL
PUBLIC WATER RESERVE NO. 107

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat., 347), entitled "An act to authorize the President of the United States to make withdrawals of public lands in certain areas", as amended by act of Congress approved August 24, 1912 (37 Stat., 497), it is hereby ordered that every smallest legal subdivision of the public land surveys which is vacant unappropriated unreserved public land and contains a spring or water hole, and all land within one quarter of a mile of every spring or water hole located on unsurveyed public land be, and the same is hereby, withdrawn from settlement, location, sale, or entry, and reserved for public use in accordance with the provisions of Sec. 10 of the act of December 29, 1916 (39 Stat., 862), and in aid of pending legislation.

(Sgd.) CALVIN COOLIDGE

President.

April 17 1926.

Two carbons to General Land Office

Figure 5 - Executive Order

Conditions Found on the Ground

The third standard parallel north was retraced with recovery of most of the original standard corners and five original closing corners for townships 12 north. In 1936 and 1946, the mile posts along the state boundary had been remonumented, or reestablished at single proportionate positions based on the original 1875 survey. The positions of all recovered boundary monuments were well correlated and refute the alleged retracement by Santee.

Figure 1 is a composite sketch of the original plats and shows the original dimensions as shown on the approved plats. All recovered original corners are indicated as well as the mile posts recovered in 1936 and 1946.

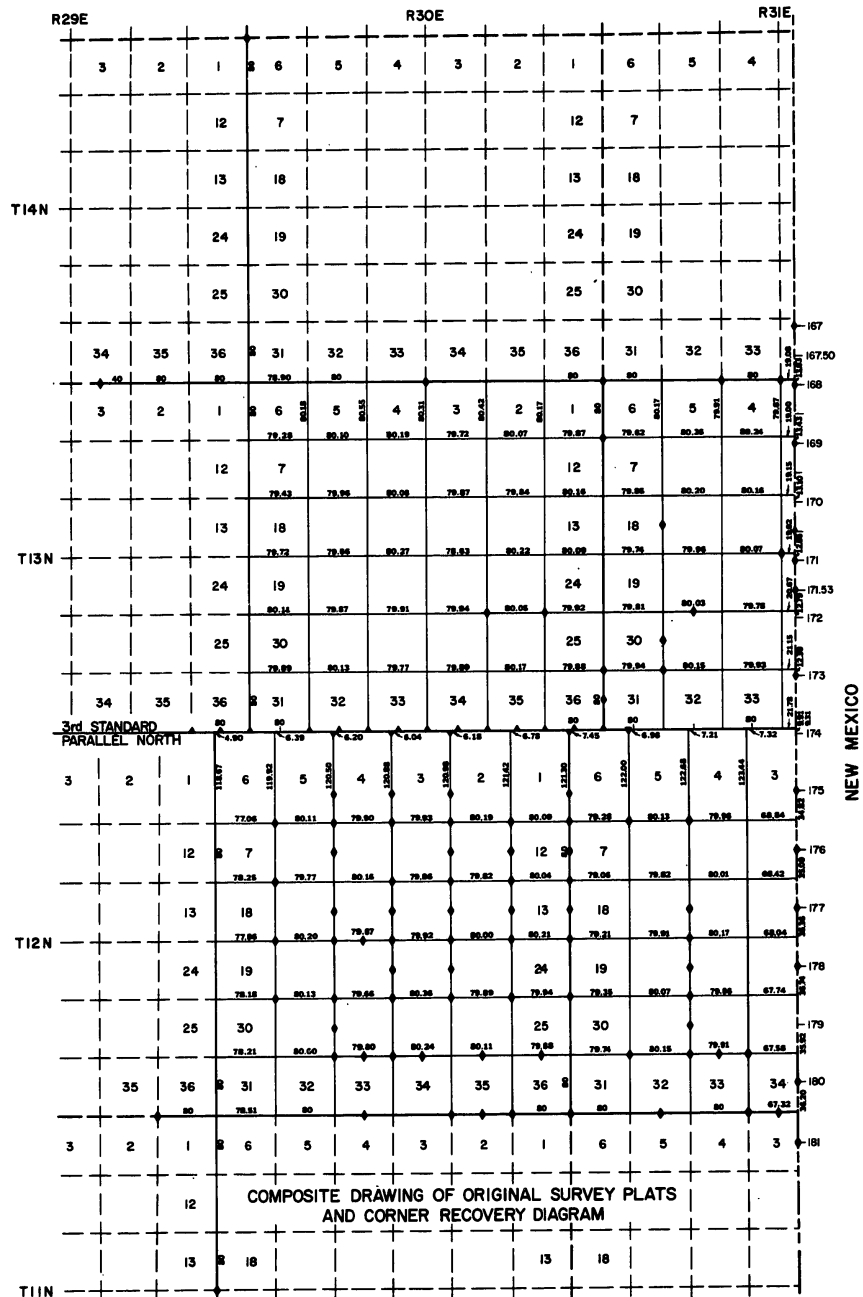


Figure 1 - Composite Sketch

Statement of the Problem

These surveys require normal procedure of single and double proportionate measurement based on the original plats for normal, elongated and fractional sections.

There are discrepancies between the Santee plats and field notes in three specific instances. The plat of T. 13 N., R. 31 E., shows a tie from the closing township corner to the 168 mile post of 13.03 chains. The field notes report this tie as 13.35 chains. This same plat shows a tie from the third standard parallel to the 174 mile post of 9.91 chains.

The plat of T. 12 N., R. 31 E., shows this tie to be 9.31 chains. The Land Office copy of this plat shows 9.91 chains, and the field notes report the distance as 9.91 chains. The plat of T. 12 N., R. 30 E., shows the line between sections 6 and 7 as 77.06 chains, but the field notes say this mile is 77.96 chains in length. Figures 2 and 3 are copies of the original plats of the four townships with the erroneous portions enlarged for clarity.

In 1882, Santee reported retracing the state boundary and returned distances and bearings that vary considerably from the record of the original Robbins survey of the boundary. Robbins reported his monuments to be 80 chains apart and on a due south bearing. Santee's own retracements were not shown on his plat nor used to compute the areas of the lots in the fractional sections along the boundary. Santee thus disregarded his own work. Toland, Walsh and Bilbray did not use the Santee retracements in restoring the lost mile posts along the boundary.

Regulations

This case requires application of the following section of the Manual of Surveying Instructions, 1973:

3-43, 3-51, 3-11:9, 3-70	Quarter comers of minimum control
3-126	Springs and Waterholes
5-23	Retracements and discrepancies
5-25 to 5-28	Double proportionment
5-30 to 5-38	Single proportionment
3-68 to 3-73, 5-41	Closing comers
3-83, 3-92, 4-41	Elongated sections

Arizona - New Mexico state boundary was resurveyed under the 1930 Manual of Surveying Instructions. The remonumentation and restorations were made prior to the present prohibition against restoring state boundaries.

TOWNSHIP N°13 NORTH RANGE N°31 EAST

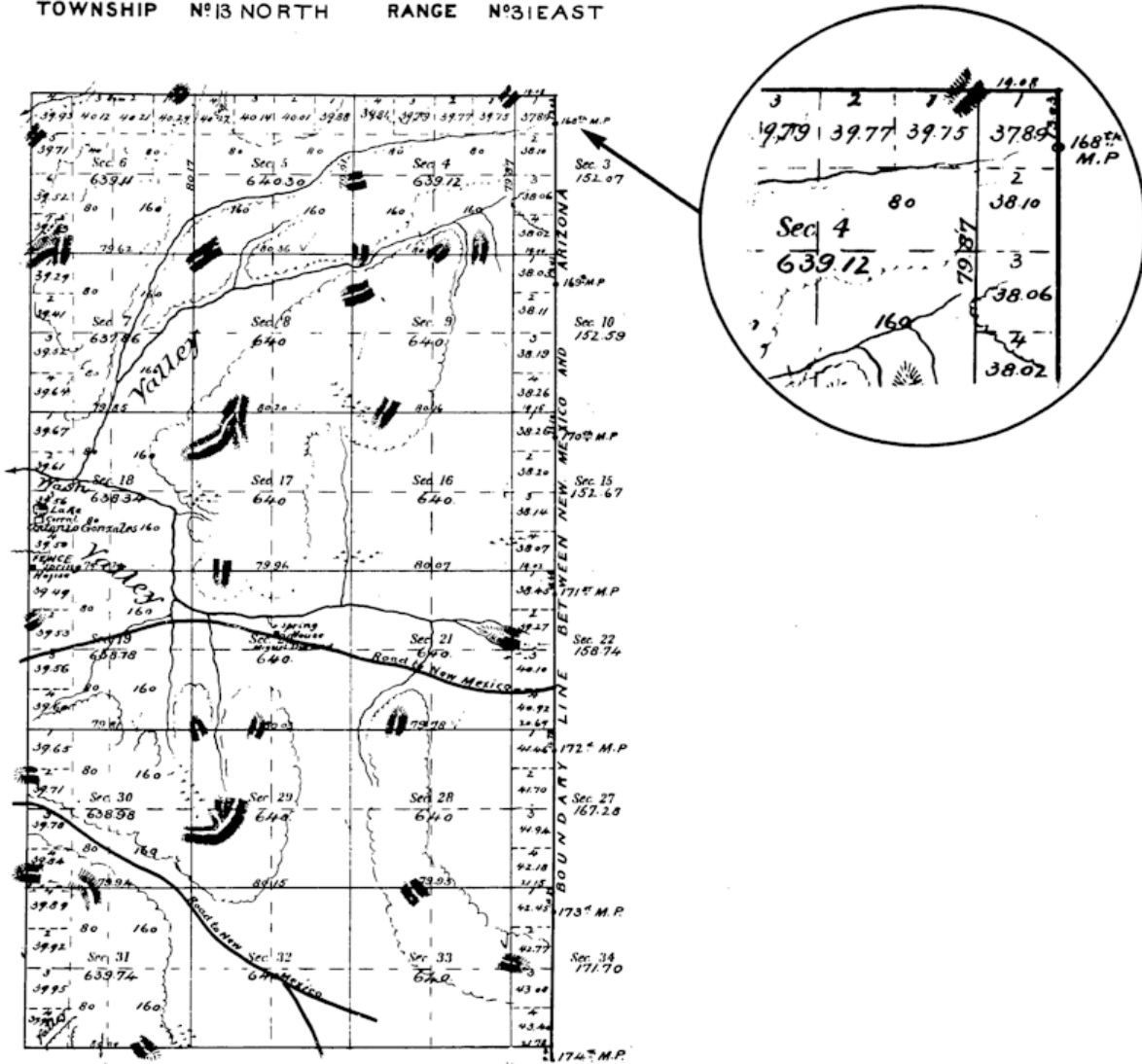
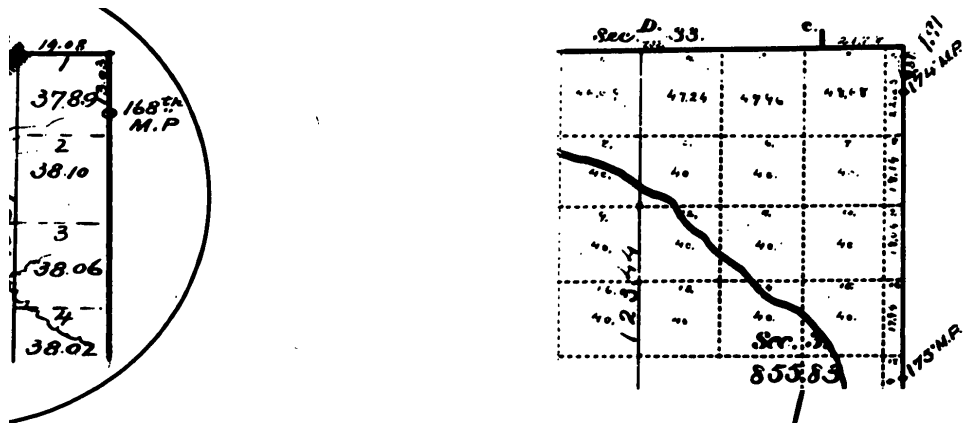


Figure 2a - Portion of Original Plat



Township N°12 North Range N°31 East

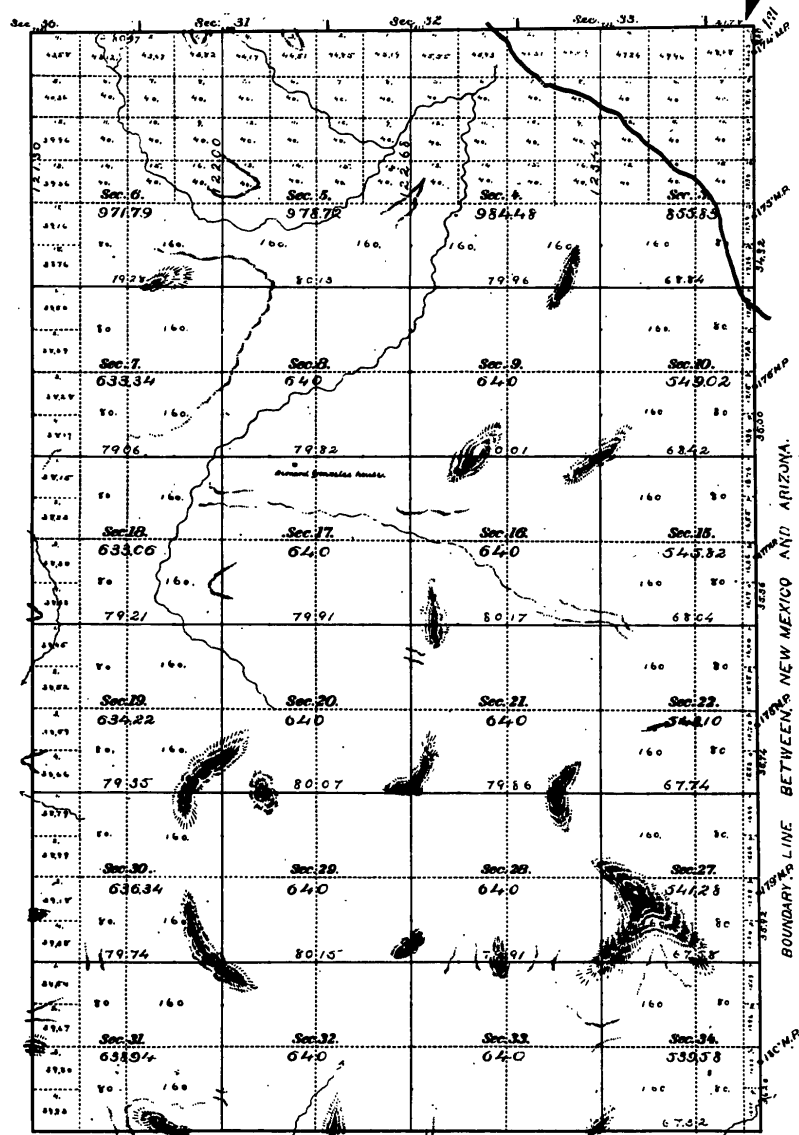
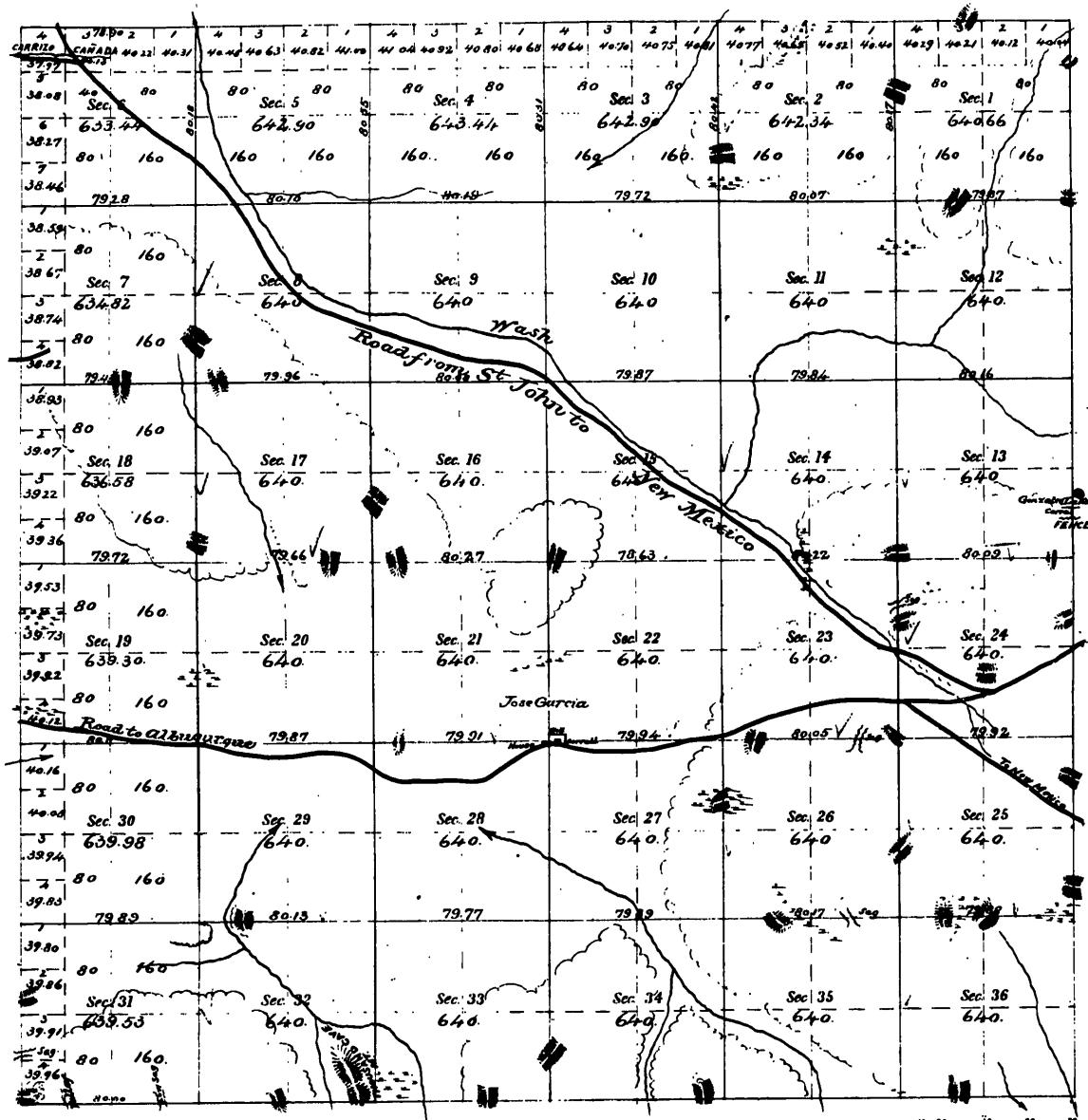


Figure 2b - Portion of Original Plat

TOWNSHIP N°13 NORTH RANGE N°30E EAST GILA AND SALT RIVER MERIDIAN



Total number of Acres 23035.89

Survey Designated	By Whom Surveyed	Date of Contract	Amount of Survey	When Surveyed	Mean Direction
Township Lines	Milton Santee	April 29 1882	17 78 50	June 28 to July 1 1882	14° 11' E
Subdivisions	"	"	59 78 52	Aug. 30 to Sept. 5 "	14° 00' "
Standard	"	"	6 00 00	June 5 to 6 "	14° 00' "

Figure 3a - Portion of Original Plat

Township N°12 North Range N°30 East, Gila and Salt River Meridian.

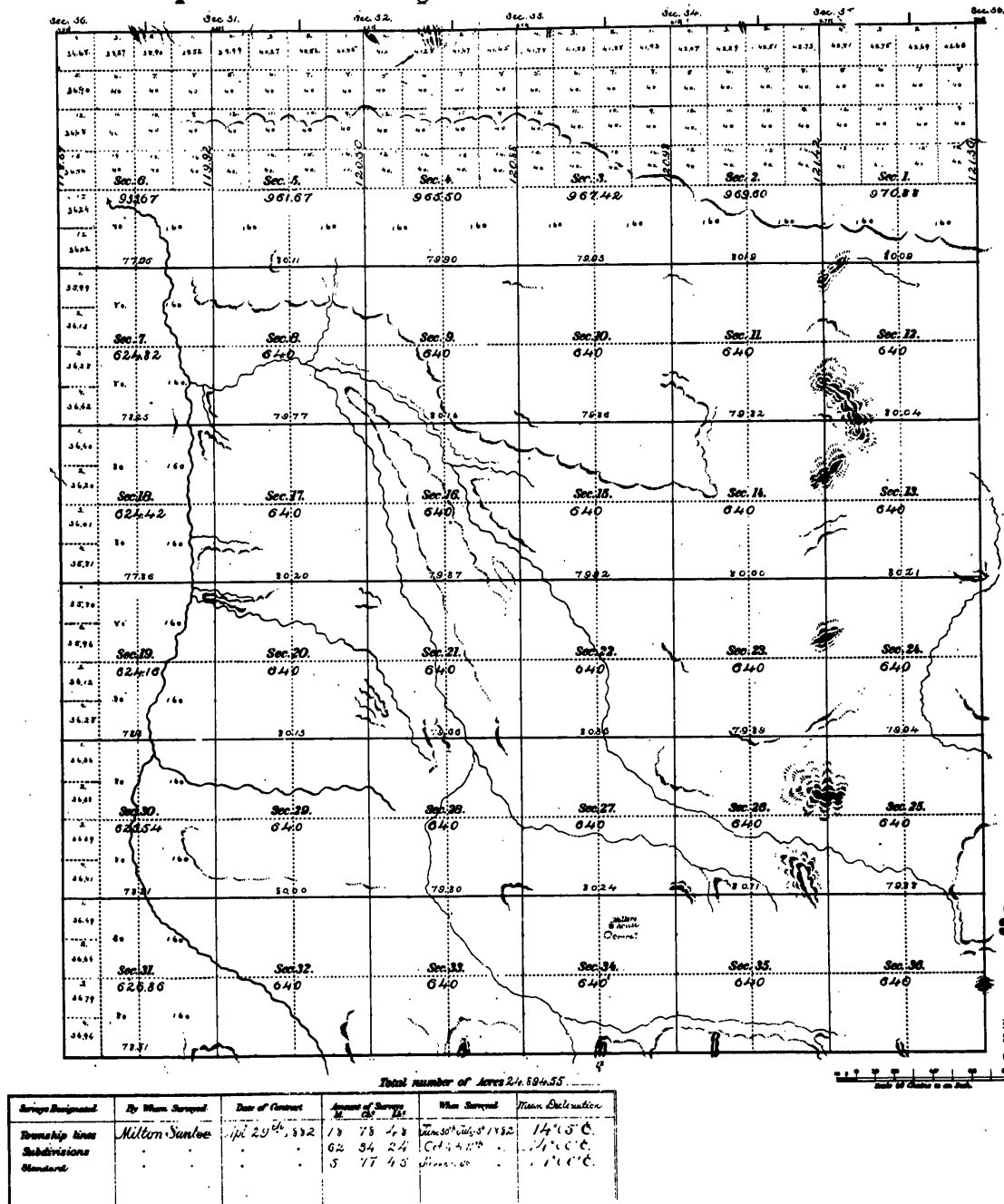


Figure 3b - Portion of Original Plat

Final Solution

Third Standard Parallel

The closing corner at the intersection of the third standard parallel and the state boundary was restored by single proportionate measurement between 173 and 174 mile posts, based on a tie of 9.91 chains, as shown on the plat of T. 13 N., R. 31 E., and as given in the field notes. The areas of lots 2, 3 and 4 of section 3, T. 12 N., R. 31 E., are based on a distance of 9.91 chains also. The 9.31 chains tie shown on the plat of T. 12 N., R. 31 E., was rejected. All lost corners along the third standard parallel north, including the lost closing corners, were then restored by the single proportionate measurement method, based on record.

T. 12 N., R. 30 E.

The northwest corner of the township, a closing corner, was restored by single proportionate measurement along the standard parallel. The southwest corner of the township was restored by double proportionate measurement. All lost corners along the south, east and west boundaries were restored by single proportionate measurement. The lost section corners within the township were restored by double proportionate measurement, and the lost 1/4 section corners by single proportionate measurement between the recovered or restored section corners. The 1/16 80 and 1/16 100 corners for the elongated sections 1 thru 6 were established by single proportionate measurement in latitudinal position, based on the original plat, after the closing corners were recovered or restored on the standard parallel. The 1/4 section corner of sections 6 and 7 was restored by single proportionate measurement based on an original length of 77.96 chs. The plat shows this mile as 77.06 chs. but the field notes report 77.96 chs. The areas of the lots in both sections are based on a 77.96 chs. distance. The dimension shown on the plat is a mistake.

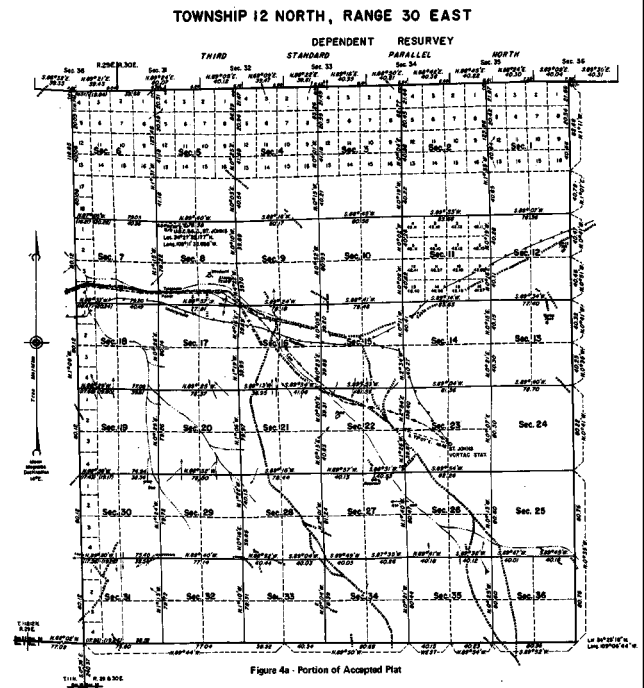
The 1/4 section corners of sections 1 thru 5, were established at midpoint in departure between the closing corners and on the standard parallel. The 1/4 section corner for section 6 only, was established 40 chains west of the closing corner of sections 5 and 6, proportionately based on a total record departure of 78.51 chains.

See plat enlargement 4a next page

Figures 4a through c, show copies of the accepted plats of the dependent resurveys of the four townships.

The accepted plats have a few minor errors in proportioning, as follows:

T. 12 N., R. 30 E.; the tie from the closing corner of sections 1 and 2 to the standard 1/4 corner of section 35 should be 6.82 chains instead of 6.81 chains.



TOWNSHIP 12 NORTH, RANGE 30 EAST

DEPENDENT RESURVEY

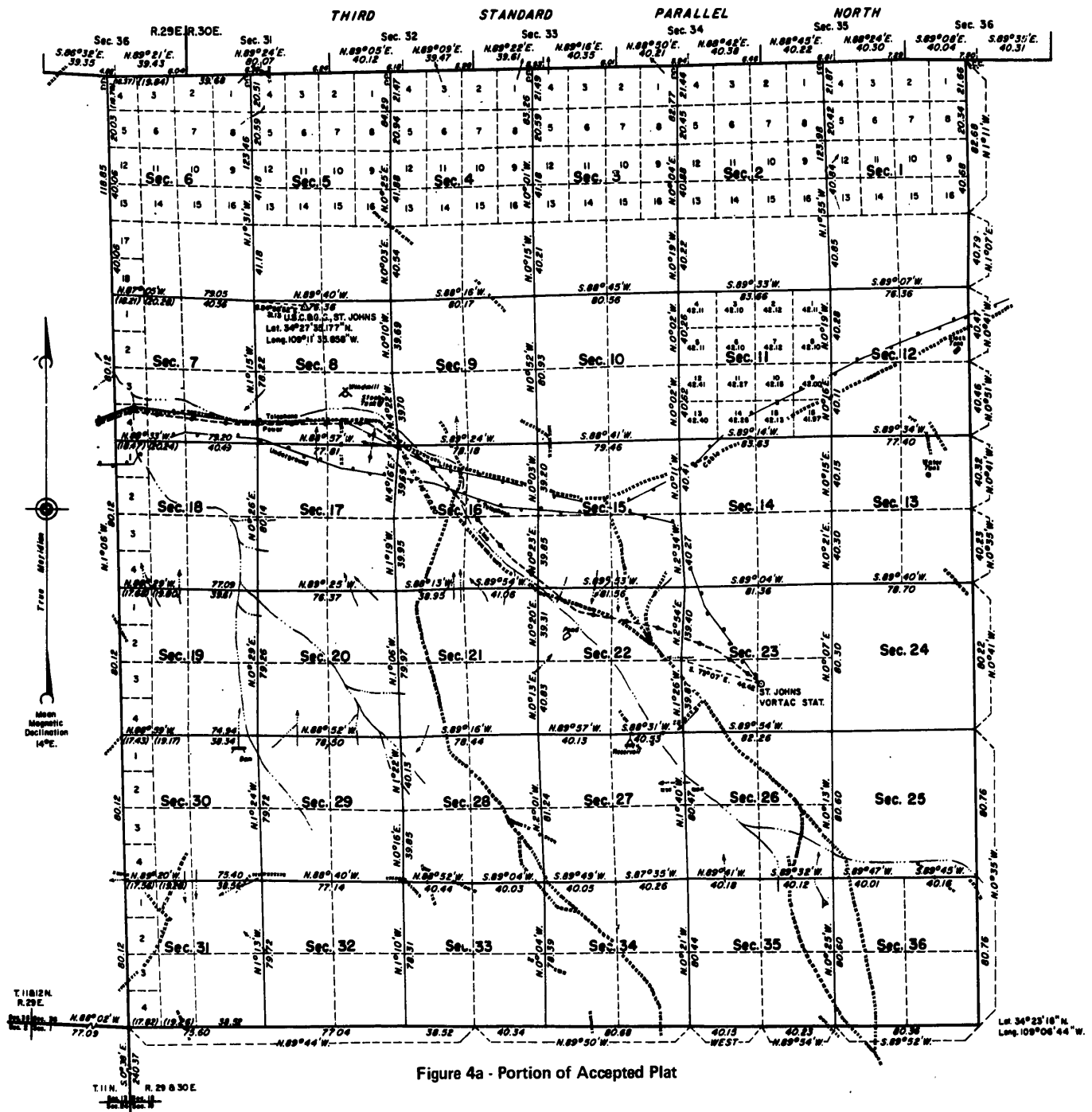


Figure 4a - Portion of Accepted Plat

T. 12 N., R. 31 E.

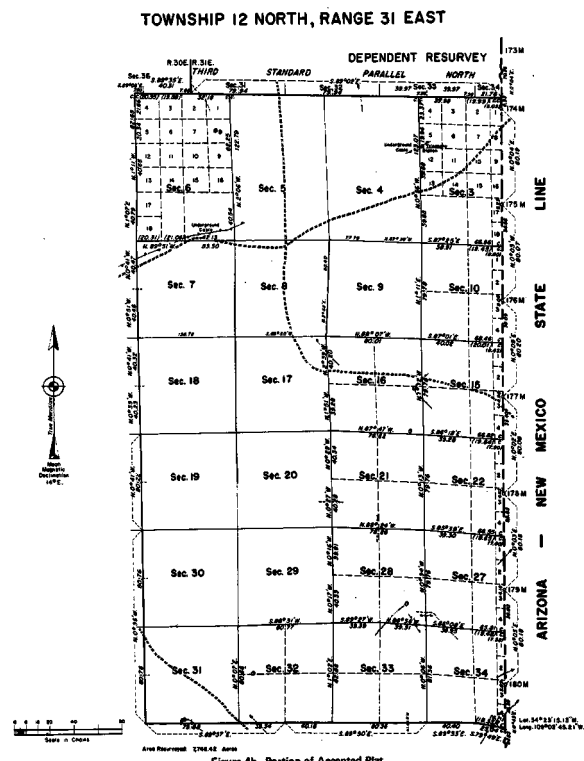
The southeast corner of the township, a closing corner, was restored by single proportionate measurement between the 180 and 181 mile posts on the state boundary. The remaining closing corners, for sections 3, 10, 15, 22, 27, and 34, were restored in the same manner at single proportionate positions between the mile posts, based on the Santee record ties and the Robbins record of 80 chains between mile posts. The closing corner of sections 3 and 4 was restored by single proportionate measurement between the restored standard corners. The closing corner of sections 4 and 5 was not restored because it did not control public lands. Lost corners on the south boundary were restored by single proportionate measurement. The necessary lost section corners within the township were restored by double proportionate measurement between recovered or restored control corners. The % section corners were then restored by single proportionate measure, all based on the record plat. The 1/4 section corners of minimum control for sections 10, 15, 22, 27 and 34, along the state boundary, were established at midpoint in latitude between the closing corners. The 1/4 corner on the east boundary of section 3 was established at 40 chains in latitude, proportionately, north of the closing corner of sections 3 and 10, based on a record length of 124.73 chains. This results in a proportioned distance of 40.08 chains. The 1/4 corner on the north boundary of section 3 was established at 40 chains in departure, proportionately, east of the closing corner of sections 3 and 4. The 1/16 80 and 1/16 100 corners between sections 3 and 4 were established at 80 and 100 chains proportionately. The line between sections 5 and 6 was retraced and found to be N. 20 06' W., 123.66 chains from the corner of sections 5, 6, 7 and 8 to the original closing corner monument of sections 5 and 6. This original monument was found to be N. 20 06' W., 0.87 chains from the true point of intersection of the section line and the third standard parallel north. The true point of intersection was monumented and the original monument was marked "AM" and buried in its original position. The 1/4 corner of sections 5 and 6 was restored by single proportionate measurement between the corner of sections 5, 6, 7 and 8, and the original closing corner. The 1/4 section -corner on the north boundary of section 6 was established 40 chains in departure, proportionately, west of the newly established closing corner of sections 5 and 6, based on a record of 80.47 chains for the north boundary of section 6.

See plat enlargement 4b next page

Figures 4a through c, show copies of the accepted plats of the dependent resurveys of the four townships.

The accepted plats have a few minor errors in proportioning, as follows:

T. 12 N., R. 31 E.; the tie from the closing corner of sections 3 and 4 to the standard 1/4 corner of section 33 should be 7.31 chains instead of 7.33 chains.



TOWNSHIP 12 NORTH, RANGE 31 EAST

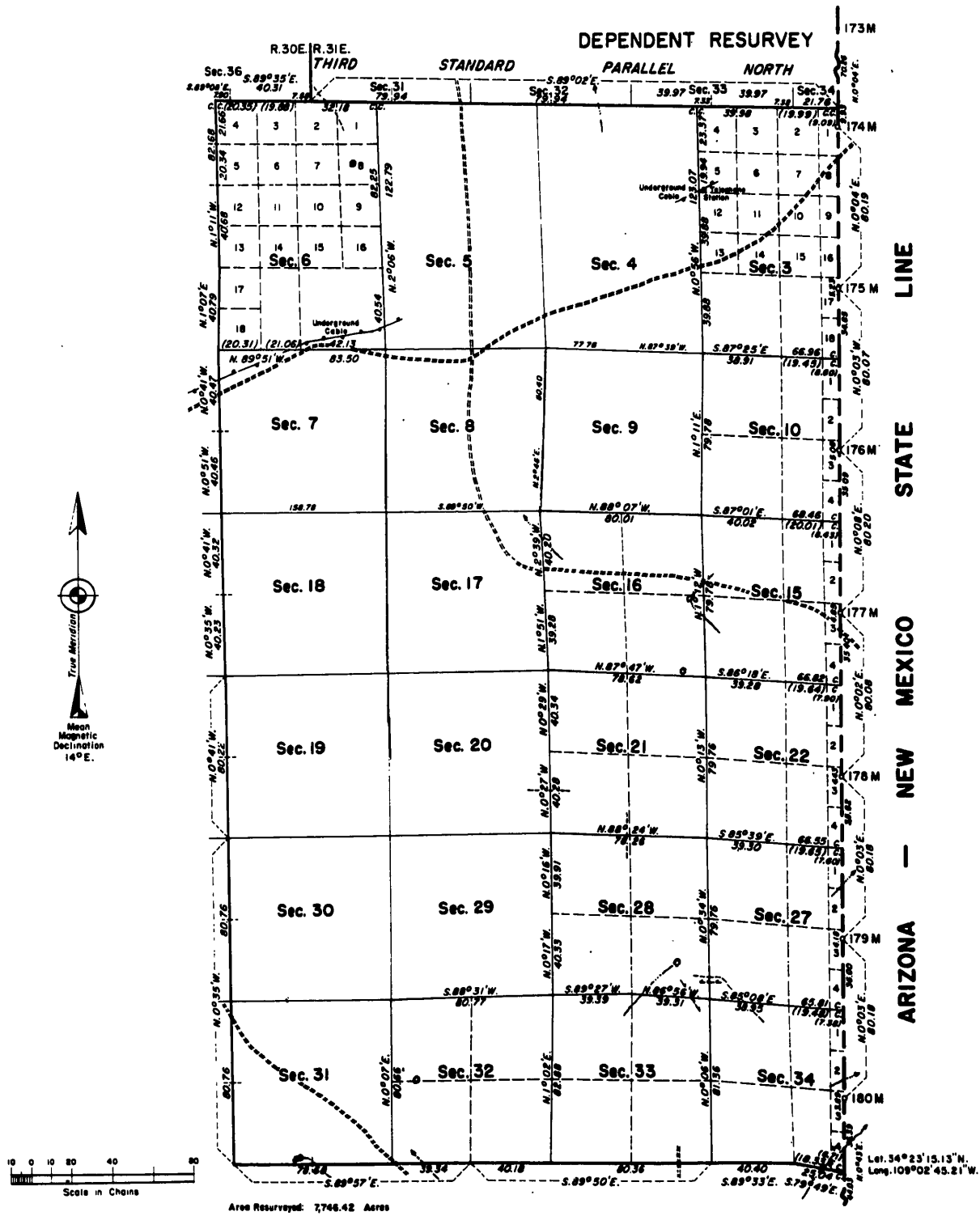


Figure 4b - Portion of Accepted Plat

T. 13 N., R. 30 E.

The northwest corner of the township was restored by double proportionate measurement, based on the original plats, the control points being 6 miles north, 6 miles south, 3 miles east and 2 1/2 miles west. The lost corners along the boundaries of the township were then restored by single proportionate measurement. Only two section corners were recovered within the township. All the remaining section corners were restored by double proportionate measurements. All the 1/4 section corners were restored by single proportionate measurement. All proportions were based on the record plat.

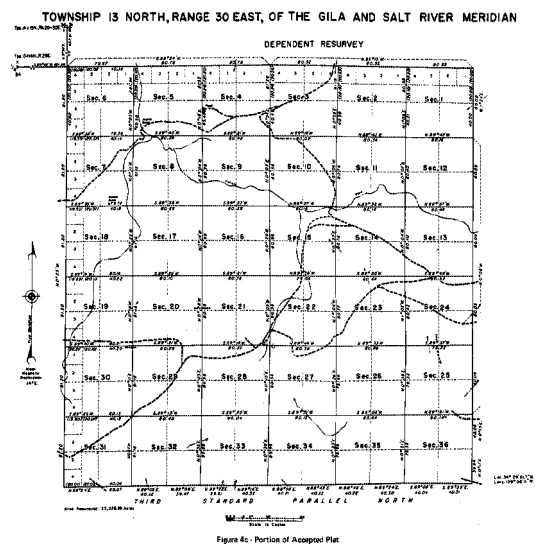
The line between sections 15 and 22 is apparently in error on the original plat. The length is shown as 78.63 chains. The field notes also return this mile as 78.63 chains. Sections 15 and 22 does not close within the limits given in the 1881 Manual. There is no conclusive basis for rejection of the given dimension and, even though it is suspect, the record value of 78.63 chains was used as the basis of the proportioning.

See plat enlargement 4c next page

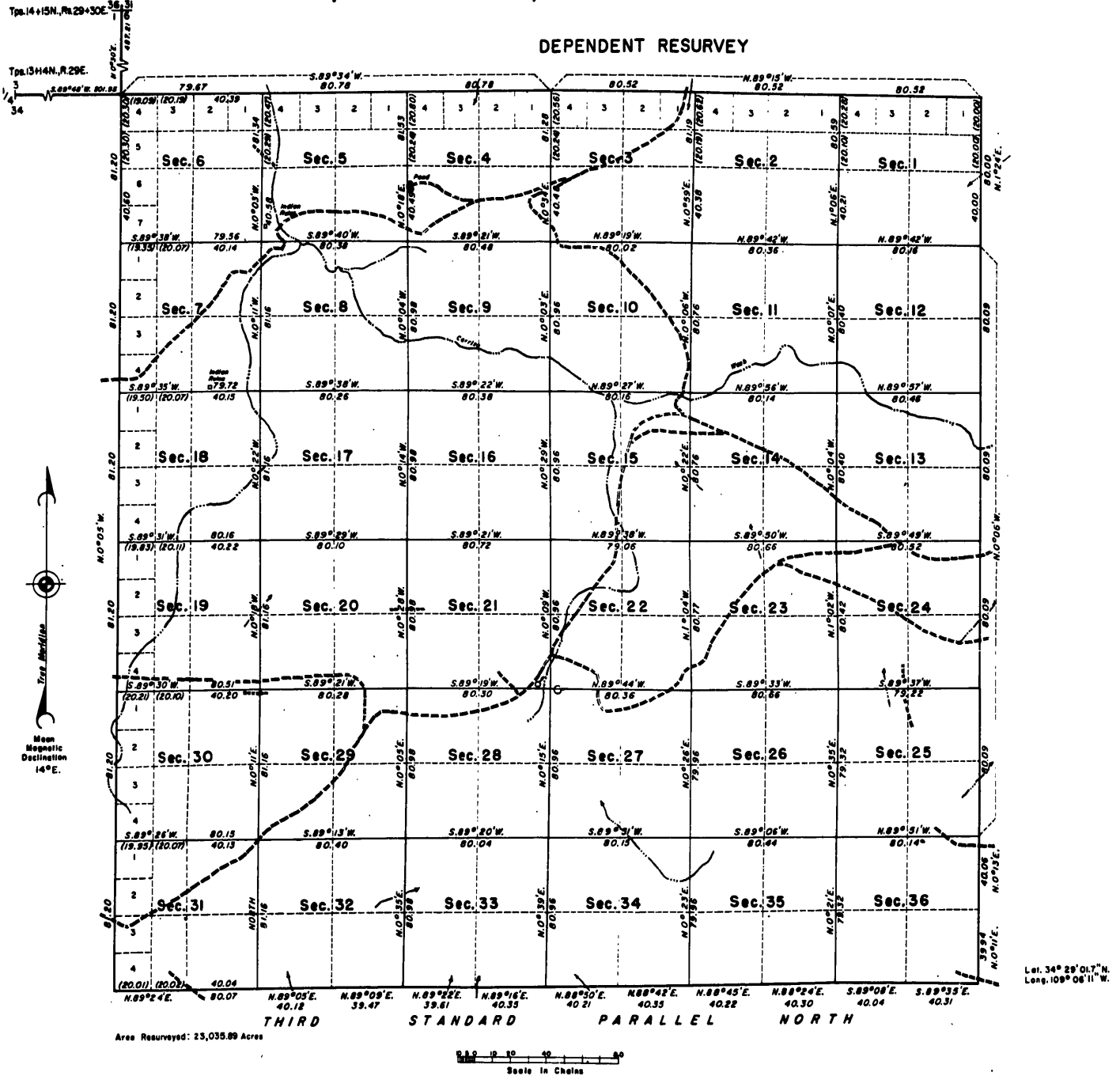
Figure 4a through c, show copies of the accepted plats of the dependent resurveys of the four townships.

The accepted plats have a few minor errors in proportioning, as follows:

T. 13 N., R. 30 E.; the line between sections 21 and 28 should be 80.32 chs. instead of 80.30 chs. The line between sections 22 and 27 should be 80.34 chs. instead of 80.36 chs.



TOWNSHIP 13 NORTH, RANGE 30 EAST, OF THE GILA AND SALT RIVER MERIDIAN



T. 13 N., R. 31 E.

The northeast corner of the township, a closing corner, was restored at proportionate distance between the 167th and 168th mile posts, using 13.35 chs. as the record tie to the 168th mile post. The plat shows this tie as 13.03 chs. The field notes return 13.35 chs. The areas of Lots 1 thru 4 of section 3 are based on a distance of 13.30 chs. The field note tie is more nearly compatible with the areas, than is the plat tie. Therefore 13.35 chs. was used. The closing corners of secs. 3, 10, 15, 22, 27 and 34, were restored by single proportionate measurements along the state boundary, between mile posts, based on the plat and Robbins' record. The lost corners along the north boundary were restored by single proportionate measurements. The lost section corners within the township were restored by double proportionate measurements using recovered or restored corners for control. The lost 1/4 corners were then restored by single proportionate measurements. The 1/4 corners along the east boundary, the state line, were established at midpoint between restored closing corners, except for section 3. The 1/4 corner for section 3 was established at 40 chs. in latitude, proportionately, north from the closing corner of sections 3 and 10, based on a record of 79.92 chs. for the east boundary of section 3. This resulted in a proportionate distance of 40.02 chs. in latitude.

See plat enlargement 4d next page

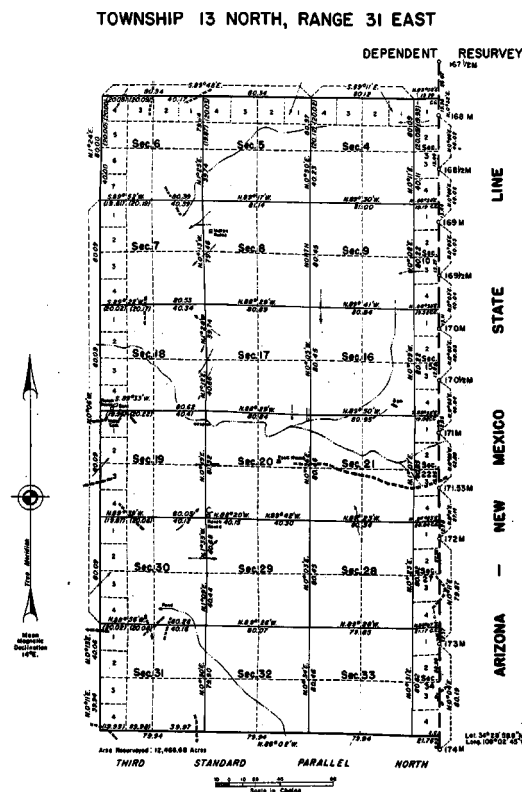


Figure 4d - Portion of Accepted Plat

TOWNSHIP 13 NORTH, RANGE 31 EAST

DEPENDENT RESURVEY

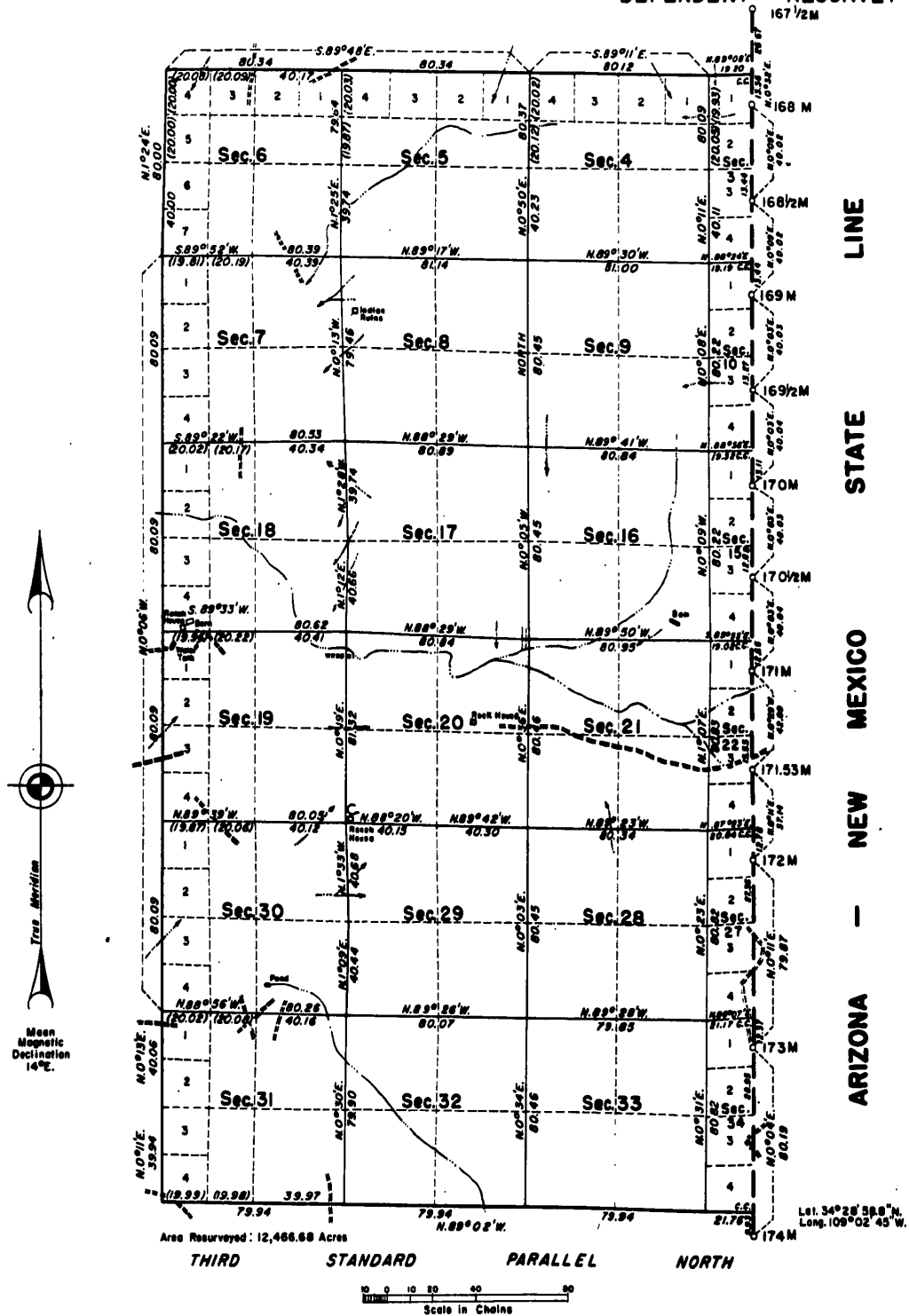


Figure 4d - Portion of Accepted Plat